Dr. Blaxall's Report to the Local Government Board on the Sanitary Condition of Padstow (Cornwall), with reference to an Epidemic of Typhoid Fever in 1876, and to continued Prevalence of Diphtheria.

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General description.

Padstow, a small town and Urban Sanitary District in the St. Columb Union, about two miles from the north coast of Cornwall, is situated partly in a valley which falls from the west to the shores of the River Camel on the east, and partly on the slopes of the hills which bound the valley on the north and south sides. The river, after receiving several small tributaries, flows into the sea about two miles to the north of Padstow. The town is very irregularly built, the streets are narrow, and some of them very steep; it possesses quays, also two or three yards for shipbuilding purposes, and a small basin has been constructed for vessels of light draught.

Geology.

The geological formation is principally Devonian, underlying porous subsoil. The hill to the north of the town is traversed from east to west by a vein of limestone, while a fault passes in a direction from north-north-west to south-south-east, intersecting the Devonian and limestone rocks, and extending beyond the limits of the town.

Population.

The population in 1871 amounted to 1,991. The people are chiefly engaged in fishing, shipbuilding, and other maritime employments.

SANITARY CONDITIONS.

Dwellings.

A great number of the dwellings stand in narrow streets or in confined courts or alleys, and have no through ventilation, and no ground space belonging to them. The accommodation in many instances is very limited, consisting of only two small rooms. The flooring of the lower room, usually formed of concrete or stone, is often much broken, as was also observed to be the case in respect of the pavement of certain of the yards. Many of the dwellings are in a very dilapidated and dirty condition, and not a few suffer from dampness, especially in the lowest parts of the town, owing to the circumstance that at high tides the water of the river flows up the sewers, and forces the inlets of the drains, flooding the yards and basements of the dwellings. Witherell's Alley, Jacob's Court, and a court in Middle Street may be particularised as affording examples of one or more of the foregoing conditions.

Excrement removal and disposal.

The means employed for excrement removal and disposal consists of pails, pan-closets, and cesspit privies. (*a.*) The pails were introduced with a view to meet the difficulty experienced in providing privy accommodation for such of the dwellings as had no ground space attached, but they have been extended to houses where no such obstacle exists; they resemble ordinary slop-pails with covers, and are made use of to receive the contents of the chamber utensils. The pails are obliged to stand in occupied rooms or in the immediate vicinity of the dwellings, but they appear to be kept in a cleanly condition, and to be occasionally used for general purposes. No means of deodorization are employed. Each morning the pails are placed outside the doors of the dwellings when a scavenger calls round with a large wooden tub, into which he empties the contents and carts them away into the country, where they are stored and sold for agricultural purposes. The process of removal is much complained of as creating nuisance, and apparently not without cause, as the wooden tub above referred to was at the time of my visit saturated with filth, showing that the cleansing of it is greatly neglected although disinfectants are said to be provided for the purpose. (*b.*) The pan closets, as a rule, are external to the dwellings, but a few are situated inside and have no communication with the external air. They discharge into the sewers and are mostly unprovided with means for flushing, the exceptions being where they are in connexion with the rainwater tanks, but in the dry seasons, when the water in the tank fails, the washing down has to be done by hand. It may be observed that this method of discharging excrement into the sewers without adequate provision for flushing the closets, is fraught with serious danger to health, the excrement being liable to lodge and decompose in the drains and sewers. The privy arrangement for some six or eight dwellings, known as the Market House, is unique in the way of all that is objectionable and unwholesome, consisting of closet-pans placed at the head of the stairs opening into the living rooms. From these pans pipes are led through the wall down the outside of the dwellings, and so into the sewers. The pans are without covers, and no attempt is made to conceal them from view. (*c*.) The cesspit privies are few in number and are gradually being abolished. In two or three instances they have been replaced by privies with good galvanised iron pails, but the people studiously avoid using them, alleging as an excuse that where one privy has to serve for two or three families it is difficult to agree as to whose house the pail shall be carried through to be emptied, they therefore prefer having their own pails in their own homes. I endeavoured to point out to the people the advantages to be derived from using the wholesome method placed at their disposal rather than the ordinary pails which cause excremental pollution of the atmosphere of their dwellings.

Water supply.

There are four public wells, namely, one situated in the upper part of the town in Fentonluna Street, one in Ruthey's Lane, one in Cross Street, and one known as the "Ladywell," at the foot of South-hill. This last affords the most constant supply, and is the most frequented. The wells are shallow, and formerly the water was obtained by dipping, but now, with the exception of the well at Fentonluna Street, it is raised by pumps, it being thought that by this means the water would be less exposed to pollution. Besides the four public sources, there are several private dip wells, and two or three draw wells. The shallow character of the wells, and their situation in the midst of dwellings, render them greatly exposed to the risk of pollution, and I was told by several persons that they considered the water of their wells unwholesome, and therefore did not use it for drinking purposes. In the case of the "Lady-well," it should be mentioned that at a distance of about 200 or 300 yards higher up the valley are situated three or four foul privy-pits, drainage from which would naturally, from the fall of the land, be in direction of the well. Further, there is danger to be apprehended lest any fissure of the rock should prove a direct channel for the conveyance of impurities to the water, as was exemplified some short time since, when by means of a fissure two of the wells in the town were polluted by drainage from privy-pits some 30 or 40 feet distant. Altogether the water supply must be regarded as exposed to contamination, and very insufficient in quantity. To this latter circumstance may doubtless be attributed in a great measure the want of cleanliness apparent in many of the dwellings. In further illustration of the danger to which the wells are exposed, the following examples may be adduced :—

(1.) *Public well at Ruthey's Lane.*—The people complain of the water as being too bad for use, stating that at times it smells, particularly when after washing fish the dirty water is emptied into the drain beneath the spout of the pump, and it appears that on one occasion when some lime water was emptied down this drain the water became impregnated with it.

(2.) *A draw-well situated in New Street.*—Some few months ago the water in this well was at times discoloured, owing, it was discovered, to drainage into it from a stable which stood a few feet above the well. The people have since had the stable removed, with the result that the discolouration of the water has ceased, but percolation still goes on at the side of the well.

(3.) *A dip-well situated in Church Street.*—Exposed to the danger of sewer air gaining access to it, and becoming absorbed in the water, an overflow pipe being led from the well into a sewer.

The water of the public wells was analysed by Mr. Collins, the county analyst, in September 1876, and I append a copy of his report, which, it will be observed, is of too indefinite a character to render it of much value.

Sewerage.

In 1866 the town adopted the Local Government Act, but shortly before that time a system of sewerage had been completed, the expense of the works being defrayed partly by subscription, and the remainder paid out of the rates. The Local Board does not possess a plan of the sewers, but from the information I have received, it would appear that the system embraced the laying down of the sewers in the principal streets in connexion with a main sewer which discharges into the river at a distance of about 60 yards from dwellings, and 45 yards above the entrance to the basin. An intersecting sewer connects the sewers of Fentonluna Street, High Street, and Church Street. Altogether the sewers are about one mile and a quarter in extent, the greatest continued length being from the head of Fentonluna Street to the main outlet, a distance of about 650 yards, with a fall of about 110 feet. The sewers are oval-shaped at the bottom, and flat at the top, and are of good capacity, measuring, the largest 2 ft. 4 in. × 2 ft. 0 in., the next size 17 in. × 15 in., and the smallest 15 in. × 13 in.; they are constructed of brick, and are said to be porous. They receive surface water, also the contents of house drains, and the discharge of privies. The outfall of the main sewer is covered at half tide, and at high tide the water of the river flows up the sewers to a distance of about 200 yards. It would seem that the High Street sewer is not laid at a proper gradient, and there can be no doubt that such is the case with regard to the Duke Street sewer, for considerable deposit has been found in the lower end of it. The house-drains consist of glazed earthenware pipes, but it would appear that communication with the sewers has not in all cases been properly established, two or three instances occurring in which catchpits (since abolished) have accidentally been found to intervene. The heads of the sewers are closed by Mason's traps, and the inlets of the drains are all trapped. The latter are usually situated outside the dwellings, but two or three of them I observed to be in the back kitchens. There are no means of flushing the sewers, and the provision for the ventilation of them consists solely of eight 3-inch pipes introduced into certain of the sewers, and carried up above the houses, some of the pipes being inserted in the side instead of the crown of the sewer, while one or two have many angles thereby militating against their efficacy. The remainder of the sewers (five or six in number), are wholly unventilated, and no ventilator occurs within 200 yards of the main outlet. Moreover, no special provision has been made to intercept the communication between the sewers at the high portion of the town and those below the level of high tide, as a consequence the whole system of sewers is more or less affected by the ebb and flow of the tide. Thus in view of the manner in which the inlets of the sewers and drains are closed, together with the outfall being covered at half tide, and the water at high tide ascending the sewers, it would seem that the means provided for ventilation are wholly inadequate to the end proposed, causing the compressed air in the sewers, specially at high tides, to be driven out at the weak traps of the inlets of the drains, or at any available opening, thereby giving rise to great nuisance, of which I received frequent complaints, and to the truth of which I can testify from my own experience, for when standing unawares in the neighbourhood of one of these inlets I was made almost sick by the horrible stench arising from it. The people living in the vicinity of the outfall complain loudly of similar nuisances caused by the escape of the sewer air as the tide recedes. Prior to 1876 some of the rain-water pipes were led into the sewers, but during the prevalence of typhoid fever, to be presently referred to, the Sanitary Authority, recognising in such connexion a source of danger to health, caused the pipes to be broken off. "The mill leat," formerly used for the purpose of working a mill, has since been converted into a sewer. It is square shaped, formed of rough stone, and is unventilated. In its course it passes behind the houses in Church Street, then crosses over the Duke Street sewer, a lip being placed and connexion established with the said sewer in order to relieve the leat of any excess of water. After this it passes at the back of the houses in Duke Street, and ultimately enters the main sewer at the lower part of the town. I am told that the stream which supplies the leat never entirely fails, though, after long drought, it becomes very small. The opinion is entertained that if it were again dammed, as was formerly the case when the mill was worked, sufficient water would be obtained for the occasional flushing of certain of the sewers. Independent of the system of sewers above described, there is a short sewer laid in Edmond's Lane which discharges into the river; it is about 140 yards long, and formerly possessed only one ventilating pipe, but in consequence of the pent-up air having on one occasion burst the sewer, a second 3-inch pipe was introduced, but even now the ventilation is very inadequate, as evidenced by sewer-air escaping at the traps, and at the time of my visit the evil was increased by the outlet being choked with stones, which it would appear is no uncommon occurrence. Two or three of the houses in High Street have no drains, but St. Saviour's Lane, containing about six or eight houses, is said to be the only part of the town totally unsewered. Having regard to what has herein been stated with reference to the discharge of excrement into the drains and sewers under conditions favouring lodgment and decomposition, together with the absence of all means of flushing the sewers, and the inadequate provision for the ventilation of them, also the extent to which the pent-up sewer air is compressed at high tides, it is obvious that the sewers in their present condition are a source of danger to public health.

Surface nuisances.

Scavengers are employed for the purpose of removing house refuse, cleansing the streets, &c., which duties appear to be systematically and efficiently performed, and owing to supervision exercised by the sanitary authority the town is more than commonly exempt from nuisance arising from pigsties.

Sickness and Mortality.

Health of the town in recent years.

Padstow, I am informed by Mr. Marley, the medical practitioner in the town, suffered severely from typhoid fever in 1869. I have, however, no data of the mortality in that or in the two subsequent years. But it would appear by the death registers that during the four years 1872–75 the town was remarkably exempt from the seven principal zymotic diseases, three deaths only in that period being referred to these causes, namely, one to "fever" in 1873 and one to "fever" and one to diarrhœa in 1874. In 1876, however, three deaths were registered from diphtheria, five from typhoid fever and one from diarrhœa, (the deaths from diphtheria and typhoid fever being part of the two epidemics about to be considered,) and during the 10 months of the present year (1877) four deaths have been referred to measles and five to diphtheria, but no death to either fever or diarrhœa.

Epidemic of typhoid fever.

The outbreak of typhoid fever denoted by the five deaths in 1876 commenced in June of that year, one case taking place on the 10th, and another on the 20th of the month, from which date up to the 13th of October the occurrence of fresh cases was, with one exception, a matter of weekly sequence (as shown in the subjoined Table), resulting in all in 121 cases and seven deaths. Of these latter, two, it should be explained, took place beyond the limits of the urban district, but, inasmuch as the disease was contracted at Padstow, they are included in the fatal cases that mark this epidemic :—

Dates of Fever cases first coming under treatment.	During month of June.	During each of the weeks ending															In total of 19 weeks.
		July 7th.	July 14th.	July 21st.	July 28th.	Aug. 4th.	Aug. 11th.	Aug. 18th.	Aug. 25th.	Sept. 1st.	Sept. 8th.	Sept. 15th.	Sept. 22nd.	Sept. 29th.	Oct. 6th.	Oct. 13th.	
No. of attacks	2	2	2	1	1	0	4	2	25	21	20	22	7	7	2	3	121

It will be seen that the disease manifested a sudden activity in the week ending the 25th of August, the attacks rising from 2 in the preceding week to 25, and this high number was maintained with slight variation up to the 15th of September; women and children being the principal sufferers. Thus, of the 121 attacks, 50 fell upon women, 52 upon children, and the remaining 19 upon men.

With regard to the *origin of the outbreak*, I have been unable at this lapse of time to gain any detailed particulars respecting the two initial cases in June, beyond the fact that they both took place in one house situated in High Street, one of the highest parts of the town on North Hill, and the sufferers, I was informed, had not been away from home.

As to spread.—These two cases were followed during the three first weeks of July by five cases in three other houses in High Street, while the subsequent attacks up to the 18th of August (seven in number) also occurred in houses at a high elevation on North Hill, but in three different streets. Immediately after this date (18th of August) there was a sudden marked increase in the number of attacks, and the "fever" became more generally diffused, the 25 cases in the week ending 25th of August being distributed over 10 different localities, the chief incidence of the disease falling upon a block of about 12 houses situated on South or Sander's Hill; soon the fever spread to all parts of the town, with the exception of St. Saviour's Lane, already referred to as containing about six or eight houses, and being unsewered. This would appear to have been the only locality that entirely escaped. I visited 53 of the dwellings in which the fever had been present. Of these, 46 were, owing to the existing defective ventilation of the sewers, peculiarly exposed to the danger of the surrounding atmosphere being polluted by sewer air escaping either from pan-closets or inlets of drains situated in their immediate vicinity. On my remarking that one of the houses in Duke Street was more than usually removed from these conditions I was told that at the time the fever appeared in it the house was subject to great nuisances from a rainwater pipe which communicated with the sewer. The offending pipe (since cut off) belonged to an adjoining house at a lower level, and the top of it opened close to the bed-room window of the infected dwelling. With regard to the block of houses on Sander's Hill the drains from these houses communicate with the sewer, their inlets being situated immediately outside the back doors, in a narrow trench that runs along the foundation of the houses. Thus any sewer-air escaping into the trench would necessarily find ready access to the dwellings. Moreover, the houses being at a high elevation, and just below the closed head of the sewer, the air in the sewer would at this point be at its greatest pressure, and therefore more liable to be driven out at the inlets of the drains. It may be further stated that the said sewer is not one of the largest capacity, but measures 17 in. × 15 in. It is about 400 yards in length from the head to the main outlet, and possesses only two ventilating pipes, one of which has many angles. The infected houses on North Hill are provided with pan-closets which discharge into the sewers. And here it is important to note in connexion with the fever having for the first few weeks been confined to this locality, that during that period there was a continuance of hot dry weather which would combine with other conditions already noted in this Report to favour lodgment and decomposition of the infected evacuations discharged into the sewers, facilitated probably as regards the High Street sewer by the want of a proper gradient, and the evil increased by the absence of any ventilator in the said sewer. Whereas on the 4th of August there was heavy rainfall which would materially alter the condition of the sewers, and this circumstance was followed in about a fortnight, by an outburst of cases in different parts of the town, the lapsed time between the rainfall and the probable dates of the attacks (10 to 14 days) corresponding with the usual period of incubation of typhoid fever. For it must be remembered that the progress of the "fever," as shown on the Table (page 4), has reference to the time when the cases first came under treatment, and when it is probable the sufferers had for a few days previously been feeling unwell.

Conclusions.

In view of all the particulars of the epidemic as herein set forth, together with there being, as regards the sufferers, no evidence of any community of water or milk supply, I am of opinion that while the origin of the outbreak must remain undiscovered, the spread of the disease was due to the escape of specifically infected sewer air in the vicinity of the dwellings, and I base this conclusion mainly upon consideration of the following facts:—First, the localization of the "fever" to High Street and adjoining streets on North Hill, during a period when the state of the weather combined with other conditions to favour lodgment and decomposition of the infected excrement discharged into the sewers, together with stagnation of the specifically polluted sewer air. Secondly, the circumstances of the altered condition of the sewers consequent upon the heavy rainfall upon the 4th of August, having been followed at an interval corresponding with the usual period of incubation of typhoid fever, by a simultaneous outburst of cases in different localities:—the inference being that the infected excrement was washed into the lower levels of the sewers, while the infected air, being set in motion, circulated throughout the system of sewers, and under pressure from high tide or other cause was driven out at every available opening, thereby causing specific pollution of the atmosphere in the vicinity of the dwellings. Thirdly, the incidence of attacks falling upon dwellings which from their relation to pan-closets, inlets of drains, and certain rain-water pipes, were eminently exposed to the danger above described; and, lastly, the fact the sufferers were principally women and children who, from their habit of staying at home, were more continuously exposed to inhaling the infected atmosphere.

Diphtheria.

The appearance of diphtheria dates from the 18th of June 1876, when, I am informed by Mr. Marley, three cases came under treatment, the sufferers being children residing in different streets on North Hill. From that date to the present time the disease has continued to prevail, fresh cases occurring every month, with the exception of September 1876. In all I have record of 127 cases and 13 deaths. Of these latter 3 took place in 1876, the remaining 10 in 1877. With reference to those 10 deaths it should be stated that one of them is certified in the death register as due to "Cynanche-maligna," but ascertaining from the medical man who attended the case that he subsequently recognised it to have been a fatal case of diphtheria, I have classed it as such. Again, 4 of the 10 deaths occurred in a family named Vivian, living beyond the limits of the urban district, but inasmuch as the first attack was in a boy who, in every probability, contracted the disease from attending the board-school at Padstow, and was the source of infection to the other members of the family, I have included the four deaths in the fatal cases below. The progress of the disease is shown in the subjoined Table:—

Dates of Diphtheria cases first coming under treatment, and of Deaths.	1876.							1877.											Total of 18 months.
	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	
No. of attacks -	7	3	4	–	2	5	14	8	15	14	10	13	14	3	3	7	3	2	127
No. of deaths -	–	–	–	–	–	–	3	2	1	4	–	1	1	–	–	–	1	–	13

It will be seen that during the first six months (June–November 1876) the attacks were comparatively few in number, and no death was recorded; but in December there was a considerable increase attended with corresponding fatality, and from this time, with the exception of January and April, the monthly record of cases exhibits no decline until July (1877), when a marked decrease took place. The majority of the attacks were mild, but all presented essential characteristics of diphtheria, and as evidence of the nature of the disease it may be mentioned that several of the parents told me their children's voices were so altered during convalescence they could hardly understand them, and one woman that on her second child being attacked she knew from the peculiar smell that he was sickening for diphtheria, while another stated that her child during his illness coughed up a piece of white leathery stuff. Through the courtesy of Mr. Marley I had the opportunity of seeing a case in the acute stage, also one convalescing. The cases were manifestly cases of diphtheria.

As to origin.—It has been shown in this Report (page 4) that no death from diphtheria was recorded at Padstow during the four years preceding 1876, an immunity which according to the Registrar General's death returns extended to all parts of the St. Columb Union, with the exception of one death in 1875, which I understand took place at St. Merryn, about two miles from Padstow. In 1876 six deaths are referred to diphtheria in the St. Columb Union, one of which took place prior to the 18th of June (date of outbreak at Padstow), namely, in January, at Newquay, 12 or 14 miles from Padstow. Beside these six deaths, three fatal cases occurred at Padstow in December 1876, being part of the epidemic under consideration, but they do not appear in the Registrar General's return till the first quarter of 1877. In contradistinction to the exemption from diphtheria indicated in the St. Columb Union during the four years 1872-75, the disease was annually present in the adjoining Union of Bodmin, causing one death in each of the years 1872 and 1873, two in 1874, three in 1875, and four in 1876, but one only of these four was prior to the 18th of June, occurring in the first quarter of the year, and at a distance of several miles from Padstow. Diphtheria is shown by the death registers to have been present at Newquay (St. Columb Union) as well as in the adjoining union of Bodmin within a few months of the outbreak at Padstow, thereby suggesting the possibility that the disease may have been introduced into Padstow from one or other of the infected localities. I made every inquiry with a view to ascertain if such connexion could be established, but no evidence was forthcoming to that effect, nor have I been able to obtain any information to enable me to form an opinion as to the origin of the first cases at Padstow. But although no connexion with antecedent diphtheria could be traced, it is quite possible such may have existed and escaped detection, owing to the insiduous nature of the disease and the occasional mild character of the attacks as evidenced by diphtheria having been present for six months in Padstow without a fatal case occurring.

As to spread.—Since the commencement of the epidemic in June 1876, diphtheria has appeared in various parts of the town, invading in all 81 houses, 12 of which had been previously attacked with fever. I visited 46 of the infected dwellings. Some were clean, dry, and wholesome, others damp, dirty, and dilapidated. Apparently there was no marked incidence of attacks on any one locality, and, so far as I could ascertain, the presence of the disease was in no definite way associated with the unwholesome conditions detailed in this report, but it would seem to have been spread by personal communication between the sick and healthy. Thus on the occurrence of a case in a new locality other cases quickly followed in the same neighbourhood, and in like manner with regard to families, one individual being attacked the infection spread to others in the same household as exemplified in 22 houses in which multiple cases occurred, varying from two to six in number. Moreover there was direct evidence in two or three instances of the first attacks being due to personal contact with the previously infected. In this way schools would seem to have played a prominent part in disseminating the disease, inquiry showing that children from infected houses continued to attend school up to the date of being themselves attacked, when for a day or two at least the disease must have been in the incubative stage, and thus the children were a source of danger to their schoolfellows, and others with whom they came in contact. Again children were allowed to return to school within three weeks of the date of attack, being still in an infective condition, as apparently indicated by the circumstance that their return to school was followed within a few days by other cases amongst their schoolfellows, and it is worthy of note that there was a diminution in the number of attacks in the months of January and April after the closing of the schools for the Christmas and Easter holidays.

Examples:—

(1.) *Four adjoining houses in Cross Street.*—The first case appeared on the 17th of October 1876; two other mild cases followed in the same house. Subsequently the three other houses became infected, the dates of attack being respectively the 7th of November, and the 7th and 12th of December. In the last instance there was acknowledged personal communication with one of the previously infected dwellings.

(2.) *Mr. G. living in Church Lane.*—Attacked on the 8th of December, died on the 14th of December, on or about which latter date his servant was sent to her home in Middle Street suffering from diphtheria, and subsequently six members of her family became infected, one case proving fatal.

(3.) H. B. left the *board school* on the 12th of December suffering from diphtheria. He returned to school on the 8th of January, and on the 15th of January another child at the school was attacked and died on the 24th of January.

(4.) *A servant girl at the board school* attacked on the 15th of February. Her family lived in the town, and her brother had been previously infected. On the 17th of February another case occurred at the school, being one of the six cases referred to above in example 2. Thus both these individuals came from infected houses, and probably were the source of infection in one or more of the four cases that followed at the school between the 16th and 20th of February, in children who did not come from infected dwellings.

(5.) *Board School.*—Two of the children attacked on or about the 17th of February returned to school on the 5th of March, and from the 9th to the 12th of March four fresh cases occurred amongst the schoolchildren, three out of the four residing in different parts of the country, namely at Treaton, Tregirls, and Cruchley Ground. In the two latter places there had been no previous case of diphtheria. The case at Crutchley Ground was followed by five other cases in the same family, four proving fatal. (The Vivian family before referred to on page 5.)

(6.) *E. W.* left the *board school* on the 11th of June suffering from diphtheria, and returned to school on the 2nd of July. On the 6th of July another girl at the school was attacked.

Effect of age upon spread.—Of the 127 total attacks 88 fell upon children, the distribution with regard to age being as follows; namely, seven cases in children under three years of age; 72 from 3 to 12 years; 9 from 12 to 15 years, and 39 in persons of 15 years of age and upwards. Thus children between the ages of 3 and 12 years were the principal sufferers, to the extent of 56 per cent. of the total attacks and more than 10 times that of children under three years. This excess it may be observed is in accordance with experience gained elsewhere, and may find explanation partly in the circumstance that from 3 to 12 years includes the ages at which children most usually attend school, and are therefore probably exposed to greater risk of infection owing to the manner in which infected and healthy children are there indiscriminately brought together, and partly in a predisposition apparently peculiar to children of that period of life to contract the disease.

Having stated that diphtheria attacked 12 houses in which fever had previously been present it should be explained that there was a considerable lapse of time between the

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appearance of the two diseases in the said houses, and that in two or three instances it was the same individual who was the subject of both attacks, and beyond the circumstance that fever and diphtheria both appeared at Padstow in one and the same month and in the same part of the town there was, so far as I could ascertain, no feature in common between them. Thus typhoid fever prevailed with the greatest intensity in September 1876, the month in which no case of diphtheria was recorded. Again, the fever disappeared in October 1876, whereas diphtheria has continued up to the present time. Lastly the dissemination of typhoid fever would seem to have been dependent upon the agency of infected sewer air, while the spread of diphtheria was apparently effected by means of personal intercommunication of the infected and healthy.

Sanitary action and administration.

Upon the adoption of the Local Government Act in 1866, the newly-constituted Sanitary Authority drew up a code of byelaws, which were submitted to the Secretary of State, and duly sanctioned in 1867, and the authority have since taken action to improve the sanitary condition of the town, but it is evident that the measures hitherto adopted have fallen far short of what are urgently required to remedy the several sanitary evils set forth in this report. With regard to the prevention of disease the authority has no means at its disposal for the isolation of persons suffering from dangerous infectious disease, or for the efficient disinfection of clothing, bedding, &c. During the epidemic of typhoid fever disinfectants were freely distributed, and connexion between rainwater pipes and sewers cut off, but with reference to the continued presence of diphtheria no steps whatever have been taken to arrest the progress of the disease. The Medical Officer of Health and the Inspector of Nuisances are under the order of the Local Government Board. The former has held his appointment only since September last, I therefore endeavoured to explain to him the nature of his duties. I ascertained that up to the time of my visit he had received no information of the presence of diphtheria in the town, nor had arrangements been made with the registrar to supply him weekly with the returns of mortality, and with immediate notice on the occurrence of any death from dangerous infectious disease. I directed the clerk's attention to this subject, and he promised that in future the Board's circular letter dated 23rd March 1874 should be complied with.

In conclusion, I would thank the Chairman and other members of the Local Board, also the officers of the Board for their courteous assistance, and my thanks are specially due to Mr. Marley for the valuable information he afforded me.

January, 1878. F. H. BLAXALL.

Recommendations.

(1.) Proceedings should be taken under the provisions of the Public Health Act, 1875, as to nuisances, to require the owners or occupiers to adopt the necessary measures to remedy such structural or other defects in dwellings or on their premises as are injurious to health; these measures should include the placing of windows or openings at the backs of the houses where required for the purpose of securing through ventilation.

(2.) As a means of excrement removal I would recommend the adoption of a dry system in lieu of the present pan-closets, as this town does not possess that abundant supply of water which is necessary for the efficient working of water-closets. For details of management requiring to be observed when dry systems are in operation the authority may usefully consult "The Report to the Local Government Board on certain means of preventing Excrement Nuisance in Towns and Villages." Furthermore, all privies that cause nuisance should without delay be efficiently dealt with; and byelaws should be made to secure the proper construction of all closets and privies attached to new houses. The pail system as in use in this town is open to many objections, and should be rigidly restricted to houses where the adoption of a more wholesome method is from circumstances rendered impracticable. When necessity compels this system to be retained some deodorant should be applied to the contents of the pails to lessen the excremental pollution of the air of the dwellings; and in order to prevent the nuisance caused by the process of removal, a metal tub should be substituted for the wooden one now in use. The tub should be daily cleansed and disinfected, and a quantity of disinfectant should be poured into it every morning before collecting the excrement.

(3.) Measures should be taken to obtain wholesome water from extraneous sources, and to insure a continuous supply to all parts of the town, with every precaution to prevent the possibility of its becoming contaminated. Meanwhile no cesspits or other contaminating circumstances should be permitted in the near vicinity of the wells.

(4.) It is an urgent necessity that provision be made to secure the efficient ventilation of the sewers and drains. Provision should likewise be made for the flushing of the sewers. Sewers and drains should be laid down in such parts of the town as are at present unprovided, and all houses should be compelled to drain into the sewers. Care should be taken that the connexion be properly effected; particularly that every house drain communicating directly with a sewer shall have special means of ventilation, and that all slop drains ~~should~~ be properly disconnected. Where there is a reason to suspect the gradients of the sewers to be faulty, examination should be made with a view, if found necessary, of their being properly relaid. Before proceeding to carry out this, and the preceding recommendation, it is desirable the authority should consult a skilled engineer upon the subject of the sewerage and water supply.

shall /

(5.) In view of the continued prevalence of diphtheria in the town it is important that immediate measures should be adopted to prevent the spread of the disease. To this end the authority should provide a place for use as a hospital for the reception of cases of dangerous infectious diseases (Public Health Act, 1875, section 131). On this subject the authority may usefully consult the Official Memorandum "On Hospital Accommodation to be provided by Local Authorities." Sections 120 and 121, relating to the disinfecting of dwellings and things, as also sections 126 to 129 inclusive, relating to the exposure of infected persons and things, &c., should be enforced.

Copy.

Appendix.

LABORATORY OF THE ROYAL INSTITUTION OF CORNWALL.

Report on the Four Samples of Water sent for Analysis from St. Columb by William Moorman, Esq.

Truro, Sept. 23rd, 1876.

ALL these waters are perfectly wholesome, containing as they do the merest trace of organic matter and no deleterious inorganic substances. No. 1 has rather the most organic matter, and is the only one at all suspicious.

All are very hard, and to that extent ill-adapted for washing, but in this respect probably all the water in your neighbourhood is faulty.

The following table gives detailed results in grains per gallon :—

	No. 1.	No. 2.	No. 3.	No. 4.
Inorganic solids consisting of sulphate of lime, carbonate of lime and chloride of sodium	24	26	25	25
Alumina	trace	—	—	trace
Organic matter	trace (distinct)	trace	trace	trace
Hardness, Clark's scale :—				
Before boiling	18°	20°	18°	20
After boiling	11°	14°	12°	16

I have, &c.
(Signed) J. H. COLLINS,
Public Analyst for Cornwall.

No. 1. Fentonluna. No. 2. Ruthey's Lane. No. 3. Cross Street. No. 4. Ladywell.

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